

## PROCEEDINGS OF THE CLOSING CEREMONY

The Closing Ceremony of 6WCEE was held at 5.00 p.m. on January 14, 1977 in the main hall of the Vigyan Bhawan. The Honorable Minister of Works and Housing, Government of India was the Chief Guest on this occasion.

The Vice President IAEE, Prof. J.F. Borges opened the session and called upon the Organising Secretary to present report on the 6WCEE.

### *Report of 6WCEE by Dr. Anand S. Arya Organizing Secretary*

*Introduction* :—The Invitation for holding this Conference in India was extended by the Indian Society of Earthquake Technology and the Institution of Engineers (India) in Co-sponsorship of Central Water and Power Commission, Central Public Works Department, National Building Organization, Corps of Engineers Railway Board, the Indian National Group of IABSE and School of Research and Training in Earthquake Engineering and with the backing of Government of India in 1973 at the time of the Fifth Conference held in Rome. The Assembly of National Delegates of the International Association for Earthquake Engineering accepted India's invitation through the normal process of ballot and authorised the Executive Committee to decide about its dates. The dates Jan. 10-14, 1977 were decided on the basis of majority opinion of the Executive Members and the National Delegates through correspondence. The Geological Survey of India, India Meteorological Department and the National Geophysical Research Institute, Hyderabad also agreed to co-sponsor the Conference.

The Organising Committee was initially formed by the representatives of the various sponsoring organisations and later extended by co-option. Dr. Jai Krishna was elected Chairman of the Organising Committee, Dr. A.S. Arya as Organising Secretary and Sri L.S. Srivastava as Jt. Organising Secretary. The Organisational work has been done through several sub-committees as listed in the Information and Program Bulletin of the Conference.

*Funds* :—The Organising Committee decided to run the conference, more or less, on no profit no loss basis. This required a lot of judgment regarding estimation of the cost two years in advance at a time when we were having a very high rate of inflation and the number of participants from India and abroad was uncertain. The secretariat of the Indian Society of Earthquake Technology provided secretarial and equipment facilities and the Earthquake School provided the manpower.

The Institution of Engineers (India) gave us the seed money to meet the initial expenses. Use of Vigyan Bhawan facilities was arranged by the National Building Organisation, Ministry of Works and Housing, Government of India. Voluntary contributions were made available from the various sponsoring organisations in several ways.

The Official Carriers, M/s Air India and the Official Travel Agents M/s Cox & Kings extended their utmost cooperation in airlifting the preprints and providing the transport to the participants during the Conference. M/s Sarita Prakashan, through an arrangement with the Indian Society of Earthquake Technology, supplied the Conference circulars and some other printed material as their contribution. We offer our grateful thanks to all these organisations.

**COUNTRYWISE NUMBER OF CONFERENCE  
PARTICIPANTS AND LADIES**

COUNTRY	PARTICIPANTS	ACCOMPANYING LADIES
1. AUSTRALIA	11	1
2. AUSTRIA	2	
3. BELGIUM	2	
4. BRAZIL	1	
5. BULGARIA	4	
6. CANADA	16	2
7. CHILE	4	
8. CZECKOSLOVAKIA	2	
9. FRANCE	10	2
10. GREECE	2	
11. INDIA	232	28
12. INDONESIA	2	
13. IRAN	10	
14. IRAQ	1	
15. ISRAEL	1	
16. ITALY	17	4
17. JAPAN	121	9
18. LIBYA	2	
19. MEXICO	10	3
20. NEPAL	1	
21. NEW ZEALAND	5	
22. NICARAGUA	1	
23. PERU	1	
24. PHILIPPINES	1	
25. PORTUGAL	3	
26. PUERTO RICO	1	
27. SPAIN	1	
28. SWITZERLAND	4	
29. TURKEY	12	6
30. UNESCO	1	
31. U.K.	12	
32. U.S.A.	124	20
33. U.S.S.R.	12	
34. VENEZUELA	2	1
35. WEST GERMANY	8	
36. YUGOSLAVIA	20	1
	659	77

The containment of inflation within the Country has tremendously helped us in this regard and enabled the Organising Committee to extend its original plan of hospitalities and reduce the hotel charges to the participants as compared to those circulated before.

*Technical Work* :—The technical work of vetting of abstracts of papers through reviewers, communicating approval to authors, acceptance of technical papers of types A and B, planning of panel discussions and theme reports, etc. has been done by the technical committee located in Mexico, the President of IAEE, Prof. Emilio Rosenblueth being its Chairman and Dr. J. Prince, its Secretary. It is gratifying to note that a total of 425 full papers (type A) and 196 one to two page papers (type B) on twelve themes have been received and printed. All papers whose authors are present at the Conference have been discussed. Besides these 12 theme reports and 16 panel papers have been presented and discussed. To accommodate the papers and discussions during the available time a total of 17 paper sessions and 4 panel sessions have been held. (Papers received late have been included in the Proceedings).

*The Ceremonies* :—The inaugural ceremony of the Conference had several highlights. His Excellency Mr Fakhruddin Ali Ahmed, President of India, inaugurated the Conference, and released a Commemorative Stamp and a Souvenir on this occasion. Hon'ble Dr. S.D. Sharma Minister of Communications and Hon'ble Mr. H. Desai, Minister of Works and Housing, Government of India joined the inaugural ceremony. The closing ceremony being held now is being presided over by Hon'ble Mr. Hitendra Desai, Minister of Works and Housing. Their presence has greatly honoured us and encouraged the participants in their deliberations. Our grateful thanks to them.

*Participation* : It is gratifying that the participation in the Conference from India and abroad has indeed been good. The final list of participating countries along with number of participants has been tabled. A total of 736 participants from 36 countries attended the Conference. Complete list of participants with their addresses and photographs (as available) will be published in the proceedings. Those who have not given us their passport size photographs may kindly do so as early as possible.

*Exhibits* :—An exhibition of seismic instruments and books has been arranged. The list of exhibitors is given in the Information and Program Bulletin of the Conference.

*Other Programs* :—Social and Cultural and Ladies' programs have been carried out as per program except for minor changes. The visits to School of Research and Training in Earthquake Engineering, Roorkee and Taj Mahal at Agra were popular. Many delegates have opted for other long duration tours. The total number taking part in tours and excursions is 248.

*Proceedings* :—The proceedings will contain all speeches, papers, theme reports, panel discussions and discussions on papers. To permit more discussion, written discussions will be permitted after the Conference. The time schedule will be as follows:

Last date for written discussion to be received at Roorkee	April 30, 1977
Last date for receipt of author's closure	June 30, 1977

It is hoped that the Proceedings will be ready for mailing by Oct. 31, 1977.

*Acknowledgement* :—Now I would wish to record my deep appreciation for the guidance provided by the Chairman Dr. Jai Krishna, the Vice-Chairman Lt. Gen. J.S. Bawa and the Convener Reception Sub-Committee, Lt. Gen. M.M.L. Chhabra at all stages of the Conference. We are deeply indebted to Mrs. B. Chhabra for planning and executing a very interesting Ladies' Program. Mr.

G.C. Mathur has worked with me like an elder brother and shared my stresses and strains. Sri H.M. Chaudhury and his team took great pains for collecting material for the Souvenir and Mementos for the participants.

All members of the Organising Committee and, Convenors and members of various sub-committees have put in their best in whatever part of work they were involved. My hearty thanks to them.

We thank the project authorities in Uttar Pradesh, Karnatak, Tamil Nadu, Andhra Pradesh, Maharashtra and Gujarat and Head of Earthquake School for providing facilities to our delegates during the tours and to the Chairman of Mysore Power Corporation and Kerala State Electricity Board and Chief Engineer, Nagarjun Sagar Dam for treating the delegates as Project guests.

Lastly I must express my affectionate regards to my colleagues from the Earthquake School who have worked as a cohesive team without any concern for their own comfort or convenience of their families.

Thank you all for a very patient hearing.

*Remarks by Prof. J.F. Borges, Vice President, IAEE*

In his remarks Prof. Borges was concerned about the very broad themes adopted in the World Conferences, the papers representing a set of Brownian motion in all directions and he wished that this aspect may be considered in depth before the next World Conference so that there will be more time for discussions.

*Report by Dr. J.K. Minami, Secretary General, IAEE*

The Secretary General reported the results of elections of the various Office Bearers and Directors of the IAEE as decided by the Assembly of National Delegates as follows:

President	Jai Krishna (India)
Executive Vice-President	Donald E. Hudson (USA)
Directors	Anand S. Arya (India)
	Sheldon Cherry (Canada)
	Giuseppe Grandori (Italy)
	A. A. Moinfar (Iran)
	Jakim Petrovski (Yugoslavia)
	Jorge Prince (Mexico)
	R.I. Skinner (New Zealand)
	Haji Umemura (Japan)
Secy. General	Yutaka Osawa (Japan)
Honorary Members	Prof. Emilio Rosenblueth
	Dr. J.K. Minami

The names were received by the audience with loud applause.

*Address by Prof. G.W. Housner, Honorary Member, IAEE*

## IDENTIFYING IMPORTANT EARTHQUAKE ENGINEERING PROBLEMS

At the closing ceremony of the World Conference it is customary for an Honorary Member to offer some remarks about earthquake engineering, usually in the form of words of wisdom from a senior citizen to younger members. My advice to you at this time deals with the perception of important earthquake engineering problems. We all know that there are many problems in earthquake engineering that need to be solved. Some of these problems are more important than others and it is these that should be attacked first. I should like to pass on to you a way of perceiving important problems that I have found useful. When you return to your home after this conference, ask yourselves: what would happen in your country if a destructive earthquake were to occur next month? Then, of those things that might happen, which could have been prevented by research, by better design, or by better planning? It is unfortunately true that after a destructive earthquake it is usually recognized that certain things could, and should, have been done before the event. Let me give two examples from my country, one a good example and the other a bad example. In the first example we did think about what should be done before the earthquake occurred and we concluded that if the earthquake came and we had no strong-motion instruments installed in buildings to record their motions it would be an unfortunate loss of valuable information that we would deeply regret. Accordingly a program was begun to install instruments in a variety of buildings and when the San Fernando earthquake struck, the records we obtained did indeed provide valuable engineering information. The second example is of the other type. After the San Fernando earthquake it was very embarrassing to recognize that we should have developed better methods of aseismic design of electrical power equipment. Had this been done, damage would have been much less costly. My advice is that you should ask what aspects of the hypothetical earthquake disaster might you and your colleagues have prevented and what information might you have gained? Having thus identified important problems please try to solve them before the next destructive earthquake strikes. Put yourself in the position of being able to say: although the earthquake has occurred, it is not as much of a disaster as it might have been; we have not been negligent in our preparations.

*Address by Prof. J.K. Minami, Honorary Member, IAEE*

It is a great honour for me to be made an Honorary Member of our Association. I wish, first of all, to express my deep appreciation to the members of the Executive Committee who recommended me and to the National Delegates of Member Countries for approving my nomination yesterday at the General Assembly of Delegates.

The reason for my resignation as Secretary General is due to advanced age—70 years old in June this year and my desire to have a younger person in this position to actively and vigorously attend to matters of the central office of IAEE in Japan. Prof. Yutaka Osawa, Director of Earthquake Research Institute, University of Tokyo has been nominated as the next Secretary General to replace me and I am confident that he will perform his duties well and in accordance with the letter and spirit of the IAEE statutes.

The new President, Dr. Jai Krishna, assisted by the Executive Vice President, Prof. Donald E. Hudson of the California Institute of Technology will enhance the healthy growth and the usefulness of IAEE in the years ahead and assist our Turkish colleagues in planning of the Seventh

World Conference on Earthquake Engineering. Although not an active officer of IAEE any more, I pledge my full co-operation to the officers and directors in any way possible. It has been a great privilege to serve as Secretary General of our Association since its establishment in 1963 and I express my best wishes for greater achievements in earthquake engineering through the existence of the International Association. I am too old to give advice but look for advice and assistance from those younger than me. I wish finally to express my sincere appreciation to the members of the Organizing Committee of the 6WCEE and for the courtesy and hospitality extended to me and all the other participants during the Conference.

Thank you and best wishes and hope to see many of you at the 7th World Conference on Earthquake Engineering at Istanbul, Turkey in 1980.

*Address by Prof. Rifat Yarar, National Delegate of Turkey, the Host Country for 7WCEE*

Honourable Mr. President, Minister Desai, Honourable Delegates, Ladies and Gentlemen,

The organisation of the 6WCEE was the most successful one which was ever held. I believe this success was due to the great ability of the members of the organising committee.

All the receptions were prepared very generously. The close attention of the statesmen, especially that of His Excellency, the President of India, has been a great honour and pleasure for the guests.

It was very appropriate to leave a free day between the conference days and extend the conference to five days.

However, I think new arrangements have to be made for the implementation of the sessions for the 7WCEE.

On behalf of the Government of Turkey and the Turkish National Committee on Earthquake Engineering, I take deep pleasure in inviting you to Istanbul where the Seventh World Conference on Earthquake Engineering will be held.

I believe that it is on account of Conferences and other means of exchange of knowledges and scientific cooperations that the science of Earthquake Engineering is being developed at an accelerating pace.

The highly successful World Conferences as well as The European Conferences on Earthquake Engineering not only become the motivating power behind the improvement of our knowledge but make it possible also for men of science, with different backgrounds and traditions to become acquainted with one another. It is my belief that this humanitarian aspect of these conferences is as important as their scientific value. In conclusion, I invite again all the participants to this conference as well as Earthquake Engineers all over the world to Istanbul, and state my conviction that the Seventh Conference will turn out to be as successful and beneficial as the present one.

*Address by Dr. Jai Krishna, The New President of IAEE*

Hon'ble Minister, Dr. Borges and friends,

I am so thankful to our Honourable Minister for having accepted our invitation to be our honoured guest at this ceremony particularly because he holds the portfolio of Works and Housing for this country and is the authority to put in practice the advice of the scientists and engineers in the sphere of Housing which affects the populations in seismic zones. I welcome him very much at this meeting.

I now wish to thank the National Delegates for the honour they have done me by electing me

as the President of the International Association for Earthquake Engineering for the next four years. I consider it a great honour to me personally and to the work the Indian scientists and engineers are doing in the field of Earthquake Engineering and Seismology. I would like to assure my colleagues in this country and in all other countries who have placed confidence in me that I shall do my best to discharge this heavy responsibility with only one objective that we are able to serve mankind to the best of our ability against the devastating forces of earthquakes.

I would also like to thank Dr. Rosenblueth, Dr. Borges, Dr. Minami, Dr. Jorge Prince and the retiring members of the Board of Directors who have rendered significant services to the association in the last 4 years. Dr. Borges, Dr. Minami and Dr. Prince had to bear the brunt of the work in connection with the Association at this conference and I am happy to say that they did it cheerfully and with great efficiency.

This Association was formed at Tokyo Conference in 1960 starting with a few countries as members but has now grown in size and has been taking increasing responsibilities in the dissemination of information on Earthquake Engineering and also organising world conferences every four years. In my view this work has now reached a level which would necessitate taking stock of the situation and thinking afresh as to how to make it even more effective in the discharge of its responsibilities towards human welfare.

A study of the growth of the technical work presented at the six Conferences shows that the number of technical papers have increased enormously over these years. The increase in work is due to the increasing number of scientists and engineers taking interest in this field and has not been at the cost of quality of work. Those of us who were involved in the selection of papers for this Conference found it difficult to reject papers since every paper had something to contribute and I am sure our distinguished Theme Reporters had hard time in preparing their reports. It was difficult for them to decide what not to include.

A new idea of panel discussions has been included in this conference and it was indeed a grand success. There was however a feeling that the time allotted to each theme was insufficient for the participants to discuss it in detail. This point will need further thinking.

I now seek the advice of the new executive committee, the retiring members, our honorary and consultative members and all those who would like to help us with ideas. I would request them to send me suggestions so that we organise the next conference to give even greater satisfaction to the participants. I am sure that every one will agree that the young scientists are very anxious to present their ideas before the International audience. We were able to give very little time to them to do so and yet the very fact that they could present their ideas even though the time was short will help them acquire the necessary confidence to be able to contribute to science and technology more effectively. Perhaps increasing the number of simultaneous sessions on carefully chosen topics will be the answer.

I thank the participants for having joined us in large numbers and enriched us with their experiences and ideas. India is richer in the knowledge of Earthquake Engineering to-day than it was before the Conference.

Sir, if I am permitted to say a few words in my capacity as Chairman of the Organizing Committee I would take this opportunity of thanking my colleagues on the Organizing Committee, workers and volunteers from various organisations for working hard sincerely and devotedly long hours in order to make the conference as effective and successful as possible. I hope the participants found their joining the Conference useful and enjoyable and if so, this would be the greatest reward for the workers of the Organizing Committee.

Most of the delegates will be leaving for their homes in the next few days or even hours. I wish them 'bon voyage' a happy new year and successful endeavours in the next four years when we meet in Istanbul in 1980. To my Turkish friends I wish to give the assurance that our services

are at their disposal in the organisation of the next conference.

I thank you all for the patient hearing.

*Address of Hon'ble Mr. Hitendra Desai, Minister of Works and Housing, Government of India*

Dr. Borges, Dr. Jai Krishna, Ladies and Gentlemen,

Since the inauguration of the Conference by the President of India a few days back, I have kept myself informed of the important deliberations of the conference. I was glad to see excellent reports in the daily newspapers from which I gather that the conference has covered important grounds in exchanging knowledge and experience on the latest advances in the sphere of earthquake engineering. It is indeed gratifying to note that over 450 original research papers were presented at this conference and as many as 700 delegates participated in it.

I am sure, based on the fruitful discussions you had, the conclusions and recommendations which have emerged will enable various countries to properly direct research and development activity and also international action to tackle the problems that arise due to the occurrence of earthquakes which is one of the most deadly natural calamities. I would like, among other important things to stress the importance of world-wide cooperation and concerted national action in certain specific fields which will greatly contribute to human welfare.

Research should be intensified to devise ways and means to predict the occurrence of earthquake so that at least we are able to reduce the loss of life and injuries to human beings and thereby alleviate the sufferings of humanity.

We should ensure that new houses and buildings, both in the urban and rural, which may come up in seismic areas, incorporate safety measures against destruction due to earthquakes even at a little extra cost. The general public should be made aware of the magnitude of earthquake hazards and how to minimise these.

Studies and investigation should be undertaken in the methods of making the existing traditional types of houses and buildings earthquake resistant and a large scale programme of improving seismic behaviour of existing structures should be taken up at as low a cost as possible.

It is also important to evolve methods of undertaking reconstruction work as speedily as possible to rehabilitate the affected population thereby relieving the sufferings of the affected population. It is necessary to organise a well equipped permanent machinery which could be instantaneously pressed in service during such emergencies for undertaking rehabilitation work.

Apart from scientific and technological work, I would like to lay particular emphasis on Governmental action as well as voluntary help in the event of such emergencies which many countries which lie in seismic zones have to face. Legislative measures should be evolved to safeguard the population in the seismic zones from suffering major catastrophes.

I am glad to find that some of these aspects have been discussed at length in the conference. Dedicated work of scientists and engineers in the field of earthquake engineering is a matter of great significance to the welfare of humanity. I therefore greatly appreciate their missionary zeal and contribution to the human welfare. On behalf of the Government of India, I would like to assure you that the conclusions and recommendations of this World Conference would receive due attention in the concerned Ministries and departments.

I do hope the foreign delegates and the ladies accompanying them, who have come from different parts of the world covering long distances have enjoyed their visit to this ancient country of ours. During your short stay, besides technical deliberations and exchange of experiences in the Conference, you might have taken some time off or are now planning to do so to go around and see some parts of this vast country and the progress we have made.



You would have noticed that we have colossal problems to tackle in order to improve the quality of our life of over six hundred million inhabitants of this country. Since Independence efforts have been directed to tackle these problems, and we have achieved a fair degree of success in many vital fields. Especially, in the past several months our country is witnessing a new climate of confidence. We have been able to control inflation; we have achieved a break-through in the matter of food production; we have adopted radical measures to check the population explosion; we have given a great thrust to research and application of results in development of indigenous resources with accent on rural development; we are attempting to tackle our problems of rapid urbanization and acute shortage of housing which has resulted in slums and large squatter settlements. These are some of the great challenges which the people and Government of India are tackling with fortitude and concerted action.

As more than 55 percent of our country lies in seismic zone of moderate to severe intensity, we are conscious of the efforts required in combating the fury of earthquakes. In this venture many institutions and Government departments dealing with this problem including the School of Research and Training in Earthquake Engineering, University of Roorkee, the National Building Organisation, have done pioneering work. I am sure the holding of the Sixth World Conference on Earthquake Engineering in India has been an event of great value to the scientists and technologists and all those connected with this subject. This conference has focussed world attention to the important problem and has provided a forum for exchange of knowledge and ideas for common benefit.

On behalf of the Government of India, I would like to compliment the organisers who have made excellent arrangements for holding this world conference. I specially would like to mention the high level of competence of Dr. Borges and Dr. Jai Krishna who have been the motive force of this Conference. My Ministry has tried to render all possible assistance to them. I am confident that under the dynamic leaderships of the new President of the International Association of Earthquake Engineering, the Association will strive to serve the humanity through its devoted work.

We are now at the end of our deliberations, may I wish you a happy journey back home.

Jai Hind

*The closing ceremony came to an end after vote of thanks by Prof. J.F. Borges and Indian National Anthem was played.*